Translation

PATENT COOPERATION TREATY

PCT/JP2003/013397

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference H1843-01	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/JP2003/013397	International filing date (*day/month/year*) 20 October 2003 (20.10.2003)	Priority date (*day/month/year*) 22 October 2002 (22.10.2002)
International Patent Classification (IPC) or national classification and IPC C02F 11/04, 11/08		
Applicant OSAKA INDUSTRIAL PROMOTION ORGANIZATION		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   ☒ Box No. I Basis of the report
   ☐ Box No. II Priority
   ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   ☐ Box No. IV Lack of unity of invention
   ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   ☐ Box No. VI Certain documents cited
   ☐ Box No. VII Certain defects in the international application
   ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19 May 2004 (19.05.2004)	22 February 2005 (22.02.2005)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2003/013397

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ The international application as originally filed/furnished

☒ the description:

pages 1-20, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages 13, 14, as originally filed/furnished

pages* _____, as amended (together with any statement) under Article 19

pages* 1-7, 9-12 received by this Authority on 04 October 2004 (04.10.2004)

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-9, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, Nos. 8

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP 03/13397

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-7, 9-14	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-7, 9-14	NO
Industrial applicability (IA)	Claims	1-7, 9-14	YES
	Claims		NO

2. Citations and explanations

Document 1: Gennosuke Inoue *et al.*, "Shokubai wo mochiita shisshiki sanka houshiki ni yoru haisui saisei riyou gijutsu kaihatsu sono 1", Zosui Guijutsu, 1990, Vol. 16, No. 3, pp. 21-24; Table 4.3

Document 2: JP 2002-102828 A (Shokuhin Sangyo Kankyo Hozen Gijutsu Kenkyu Kumiai), 9 April 2002; column 2, lines 24-29 (Family: none)

Document 3: Yoshiaki Harada & Ken'ichi Yamazaki, "Shokubai wo mochiita haisui shorihou", Aromatics, 1991, Vol. 43, No. 11/12, pp. 12-22; fig. 4

Document 4: JP 2002-66507 A (Ishikawajimi-Harima Heavy Industries Co., Ltd.), 5 March 2002; column 3, lines 46-49 (Family: none)

Document 5: JP 2002-102897 A (Ishikawajimi-Harima Heavy Industries Co., Ltd.), 9 April 2002; claims and table 3 (Family: none)

Document 6: JP 11-342379 A (Japan Science & Technology Corp.), 14 December 1999; claims and figs 1-13 (Family: none)

The inventions set forth in claims 1 and 2 do not involve an inventive step.

Document 1 describes solubilization of solid organic materials by catalytic wet oxidation (equivalent to treatment to reduce the molecular weight … in sub-critical water) to give readily degradable organic materials such as carboxylic acids (especially acetic acid), and methane fermentation treatment of the solubilized material. It also mentions that the proportions of organic materials produced in the aforementioned catalytic wet oxidation can be altered by means of the temperature.

Given this, a person skilled in the art could easily conceive of investigating the conditions of catalytic wet oxidation so as to give a higher yield of acetic acid, which is the degradable substrate in the methane fermentation reaction.

In addition, as disclosed in document 2, admixed lipids are undesirable in the methane fermentation reaction; therefore, exclusion of lipids from the methane fermentation, i.e. separating the aqueous phase from the solubilized material, is merely a suitable option available to a person skilled in the art.

The inventions set forth in claims 3 and 4 do not involve an inventive step.

Document 1 discloses the fact that the behaviour of carboxylic acids in wet oxidation is affected by temperature; therefore, investigation of the optimum temperature conditions is merely a suitable option available to a person skilled in the art.

The inventions set forth in claims 5 and 6 do not involve an inventive step.

It is known that alterations in the pressure of the wet oxidation reaction and/or the reaction time change the composition of carboxylic acids and/or organic material produced by the wet oxidation reaction, as disclosed in

documents 3 and 4. Therefore, investigation of the pressure of the wet oxidation reaction and/or reaction time in the invention disclosed in document 1 is merely a suitable option available to a person skilled in the art.

The inventions set forth in claims 7, 9, 10 and 11 do not involve an inventive step.

Making the treatment continuous and investigation of methane fermentation time and percentage digestion of carbon are within the ordinary competence of a person skilled in the art.

Document 1 also discloses application of the treatment to sewerage sludge.

The inventions set forth in claims 12-14 do not involve an inventive step.

Changing the treatment temperature when treating organic waste by hydrothermal reaction using subcritical water in order to enable selective recovery of substances from the hydrothermal reaction, such as amino acids, phosphorus, fatty acids and organic acids, is known art, as disclosed in documents 5 and 6.

Given this, a person skilled in the art could easily conceive of adopting the aforementioned art in the invention disclosed in document 1.

Amendment

(under Article 11 of the Japanese Patent Law)

To the Examiner of the Patent Office Mr. Miki KATO

1. International Application No.
PCT/JP03/13397

2. Applicant

Name	OSAKA INDUSTRIAL PROMOTION ORGANIZATION
Address	c/o Mydome Osaka, 2-5, Honmachibashi, Chuo-Ku, Osaka-shi, Osaka 540-0029 JAPAN
Nationality	JAPAN
Residence	JAPAN

3. Agent

Name	IKEUCHI SATO & PARTNER PATENT ATTORNEYS
Address	26th Floor, OAP TOWER, 8-30, Tenmabashi 1-chome, Kita-ku, Osaka-shi, Osaka 530-6026 JAPAN

4. Items to be amended
Claims

5. Contents of Amendments
Claims 1 to 7 and 9 to 12 are amended and claim 8 is cancelled as per attached sheets.

6. List of attached documents

New sheets for pages 21, 21/1, and 22 (corresponding to pages 22, 22/1, and 23 of the English translation) of the claims 1 set

CLAIMS

1. (Amended) A method for producing methane gas from organic wastes, comprising:

treating organic wastes with at least one of supercritical water and sub-critical water to convert the organic wastes into low molecular weight substances while generating acetic acid;

separating a water phase containing acetic acid from the low molecular weight substances; and

subjecting the water phase to methane fermentation.

2. (Amended) The method according to claim 1, wherein the treatment for conversion into low molecular weight substances is performed selectively under a treatment condition that allows a yield of acetic acid to be higher.

3. (Amended) The method according to claim 1, wherein the treatment for conversion into low molecular weight substances is performed at 493 K or higher.

4. (Amended) The method according to claim 1, wherein the treatment for conversion into low molecular weight substances is performed at 493 K or higher and 533 K or lower.

5. (Amended) The method according to claim 4, wherein the treatment for conversion into low molecular weight substances is performed at a pressure of 0.8 to 6.4 MPa.

6. (Amended) The method according to claim 4, wherein a time taken for

the treatment for conversion into low molecular weight substances is 1 to 20 minutes.

7. (Amended) The method according to claim 4, wherein the treatment for conversion into low molecular weight substances is performed continuously.

8. (Cancelled)

9. (Amended) The method according to claim 4, wherein a time for the methane fermentation is in a range of 5 to 48 hours.

10. (Amended) The method according to claim 4, wherein carbon digestion efficiency in the methane fermentation is 90% or more.

11. (Amended) The method according to claim 4, wherein the organic waste is activated sludge.

12. (Amended) The method according to claim 4, further comprising separating and collecting a useful material generated in the treatment for conversion into low molecular weight substances.

13. The method according to claim 12, wherein the useful material generates at least one of phosphoric acid, organic acid, fatty acid, amino acid, and sugar.

14. The method according to claim 12, wherein by adjusting at least one of a treatment temperature and a treatment time in the treatment for conversion into low molecular weight substances, the useful material is allowed to be generated selectively.